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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/803,004

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Thomas Berkey

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IP LEGAL DEPARTMENT
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EXAMINER

WERNER, DAVID N

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/803,004	Applicant(s) BERKEY ET AL.	
	Examiner DAVID N. WERNER	Art Unit 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-7,10-14,16-19 and 21-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-7,10-14,16-19 and 21-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office action for US Patent Application 10/803,004 is in response to communications filed 29 January 2008, in reply to the Non-Final Rejection of 30 August 2007. Currently, claims 1, 3-7, 10-14, 16-19, and 21-24 are pending. Of those, claims 22-24 are new. Claims 2, 8, 9, 15, and 20 have been canceled.

2. In the previous Office action, claims 1, 2, 4-7, 10-15, 17-19, and 21 were rejected under 35 U.S.C. 103(a) as obvious over US Patent 5,185,667 A (Zimmermann). Claims 3 and 16 were rejected under 35 U.S.C. 103(a) as obvious over Zimmermann in view of US Patent 5,414,521 A (Ansley). Claims 8, 9, and 20 were rejected under 35 U.S.C. 103(a) as obvious over Zimmermann in view of JP 平 10-134187 A (House), relying on US 6,847,392 B1 for translation. Claims 6 and 11 were objected to as not in proper Markush format. The drawings were objected to for inconsistent numbering with the specification.

Response to Amendment

3. Applicant's amendment to the specification has been fully considered. The objection to the drawings has been withdrawn.

4. Applicant's amendments to claims 6 and 11 have been fully considered. The objection to claims 6 and 11 has been withdrawn.

Response to Arguments

5. Applicant's arguments filed 29 January 2008 have been fully considered but they are not persuasive. Applicant argues that Zimmermann does not teach the claimed limitations of transforming image data "on a pixel-by-pixel basis" and transmitting data from an image data processor to an encoder "upon completion of each pixel transformation". However, Zimmermann performs a transformation on "object points" having coordinates (u,v) in an object plane to points having coordinates (x,y,z) in an image plane (column 5: lines 39-46; column 6: lines 24-32; column 7: lines 53-62). While these "object points" may not necessarily be pixels themselves, it is respectfully submitted that JP 平10-134187 A (House), previously relied on in the rejection of claims 8, 9, and 20, explicitly cites performing a pixelwise spatial transform of picture data. Figure 5 illustrates a process of sampling pixels (column 8: lines 1-8), interpolating (column 8: lines 9-15), and mapping pixels between two images (column 8: lines 16-22), with a mapping "for each pixel".

Additionally, while Zimmermann may or may not teach buffering transformed pixels in storage buffer 4 before filtering by convolution filter 8 (column 3: lines 25-48; column 4: lines 22-25), as the specification never mentions storage of the output of transformation processors 6 and 7 in buffer 4, House explicitly cites directly outputting depth information mapped from input pixel data "for each pixel" "to the outside" upon processing without further buffering (column 8: lines 16-21). Therefore, House teaches the claimed limitation of transmitting image data from a processor on a pixelwise basis.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 4-7, 10-14, 17-19, and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,185,667 A (Zimmermann) in view of US Patent 6,847,392 B1 (House).

Zimmermann teaches an omnidirectional (wide-angle) imaging system. Regarding claim 1, figure 1 illustrates the system of Zimmermann. Image buffer 4 receives images (column 3: line 31) having a 180-degree field of view (column 3: line 28), corresponding with the claimed "first input buffer". Image processing system consisting of X-Map 6 and Y-Map 7, coupled to image buffer 4, perform a transform of the image data (column 3: lines 32-35), corresponding with the claimed "image data processor", and display driver 10 scans the transformed images for display (column 3: line 47), corresponding with the claimed "encoder". This transformation is performed on the basis of transforming "object points" having (u,v) coordinates to "image points" having (x,y) coordinates (column 5: lines 39-46; column 7: lines 53-62. However, the present invention describes outputting corrected image data "upon completion of each pixel transformation", while Zimmermann may or may not re-buffer transformed image data into image buffer 4.

House teaches a three-dimensional imaging apparatus. Regarding claim 1, in House, a wide-field image 5 and narrow-field image 8, from two separate cameras, are inputted to depth image production section 9. Mapping of each pixel is performed to determine the depth of the pixels, and each pixel depth is output "to the outside" as data in a depth image 11 (column 8: lines 16-21) without additional buffering.

Zimmermann discloses the invention except for performing a pixelwise transformation and directly outputting the results on a pixel-by-pixel basis. House teaches that it was known to immediately output pixel mapping data upon processing. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to directly output image mapping data pixelwise without an output buffer, as taught by House, since it has been held that the omission of an element and its function in a combination where the remaining elements perform the same functions as before involves only routine skill in the art. See *In re Karlson*, 136 USPQ 184.

Regarding claims 4 and 5, the image processing system of Zimmermann is coupled to microcomputer control interface 5, which communicates user-determined transformation coefficients based on input from an input means such as joystick 12 (column 3: lines 35-43). Regarding claim 6, "X-MAP and Y-MAP transform processors 6 and 7...can be accomplished with application specific integrated circuits or other means as will be known to persons skilled in the art" (column 4: lines 1-5). Regarding claims 7 and 10, camera 2 is a source of wide-angle image data (column 3: line 29).

Regarding claim 11, Zimmermann outputs data in NTSC format (column 2: lines 25-29). The examiner takes Official Notice that it was well within the level of ordinary skill in the art at the time the invention was made to output video in PAL or SECAM format if NTSC output was possible. Regarding claim 12, video is output to display device 11 (column 3: line 47). Regarding claim 13, the output of the transformation circuits is a corrected image, as shown in figure 3 (column 4: lines 36-38).

Regarding claim 14, in Zimmermann, image buffer 4 buffers wide-angle image data, transformation circuits 6 and 7 transform the buffered wide-angle image data into corrected image data, display driver 10 encodes the corrected image data, and display device 11 displays output signals. Regarding claim 15, transformation circuits 6 and 7 perform a transform of distorted hemispherical data to rectilinear data according to known mathematical transformations determined by the parameters of the wide-angle lens 1 in camera 2. Regarding claims 17 and 18, input means 12 provide user image command data to image processors 6 and 7 through microcomputer 5 to transform the buffered wide-angle image into corrected image data, based on calculated parameters determined from user command data. Regarding claim 19, transformation circuits 6 and 7 transform buffered wide-angle image data into corrected image data representative of a substantially undistorted image.

Regarding claim 21, this claim is in means-plus-function format, complying with 35 U.S.C. 112, sixth paragraph. Then, the subject matter of claim 21 is limited to that as described in the specification. In Zimmermann, input image buffer 4 corresponds with the "means for storing", X-map 6 and Y-map 7 correspond with the

“means for transforming”, and display driver 10 corresponds with the “means for encoding”.

Regarding claims 22-24, Zimmermann et al. teaches a variable zoom function “that allows a change in the field of view of the output image” (column 4: lines 61-63).

8. Claims 3 and 16 rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann in view of House as applied to claims 1 and 14 above, and further in view of US Patent 5,414,521 (Ansley). Claims 3 and 16 are directed to performing a transformation calculation based on a look-up table. Zimmerman does not disclose this feature.

Ansley teaches an image distortion correction system for a flight simulator. In Ansley, an image is displayed on a curved dome screen. As the pilot’s viewing angle changes, distortion becomes apparent and must be mitigated (column 6: lines 3-8). Regarding claims 3 and 16, a computer determines the field of view and viewing angle of the pilot for every possible type of motion for the simulator (column 6: lines 23-35), and determines a set of correction coefficients to eliminate distortion during this motion. These coefficients are stored in a look-up table memory (column 6: lines 35-39). When a certain viewing angle and field of view is received, the look-up memory provides the appropriate coefficients to correct the distortion (column 6: lines 39-66).

Zimmermann, in combination with House, discloses the claimed invention except for calculating a distortion correction based on a look-up table. Ansley teaches that it was known to store pre-calculated image distortion correction coefficients in a look-up

table memory. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to perform an image correction calculation based on data in a look-up table, as taught by Ansley, since Ansley states in column 6, lines 66-68 that such a modification would greatly increase the speed of a distortion correction process, since the pre-computed values do not have to be re-determined for each new frame.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner, whose telephone number is (571)272-9662. The examiner can normally be reached on MWF from 9:00-6:30, TR from 9:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. N. W./
Examiner, Art Unit 2621

/Mehrdad Dastouri/
Supervisory Patent Examiner, Art Unit 2621